



United States Senator

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## Policy Brief

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# THE NETHERLANDS: BACKGROUND & DEVELOPMENT OF STORM PROTECTION AND WATER MANAGEMENT

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The Netherlands is a small European nation bordering the North Sea. It has a land area that is a little bigger than 1/3 the size of Louisiana's land area.<sup>2</sup> Approximately 25% of the Netherlands lies below sea level. The Netherlands is the most densely populated country in Europe with a population of about 16.4 million people which is about 3.6 times as many people live in Louisiana (4.5 million).

Since the 8<sup>th</sup> century, the Netherlands began protecting itself from rising sea level and reclaiming low-lying areas with dikes (levees), dams and windmills. In 1953, a rare weather pattern developed combining spring tide and a hurricane-force northwesterly gale. The resulting storm surge topped many of the dikes and breached it in 900 places. Over 1,800 people drowned at a time when the population was about 10.5 million.

Following the 1953 flood, the Delta Commission was created to advise the government on the necessary steps to protect the delta region. Reflecting the Delta Commission's recommendations, the Delta Act was enacted in 1958 and did the following:

- Made flood protection a national issue - Before the 1953 disaster, flood protection was primarily the responsibility of 2,500 water boards, and the national government could only intervene when dikes were neglected. Since the disaster, the Ministry of Transport, Public Works and Water Management oversees flood protection, navigation and related issues on the national level.
- Reduced the number of water boards - As of January 2005, there are 27 water boards. The rationale for the reduction is that small water boards would be unable to prevent disasters of the magnitude of the 1953 flood. The water boards' boundaries coincide with various basins and drain areas. They have taxing authority and are virtually self-supporting. In 2004, the water boards tax revenues were nearly 2.4 billion U.S. Dollars. The water boards are responsible for flood control (including maintaining dikes and dunes) and wastewater treatment. They manage 90% of the primary flood barriers; however, their actions must comply with national policies of good water governance.

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<sup>2</sup> Louisiana's total area is 51,843 square miles (Land - 43,566 and Water 8,277).

The national government is responsible for maintaining the coastline and controlling dams which close the big sea arms. The national government and municipalities are responsible for maintaining the depth of waterways and maintaining and operating locks and bridges.

- Pursued a holistic, integrated and balanced approach to water management - While protecting the country from devastating floods, the Netherlands balanced commercial activities (shipping / navigation and fishing), technology, time, costs, landscape harmonization, historic building protection and wider social considerations.
- Constructed movable storm surge barriers - The Delta Commission recommended building storm surge barriers instead of just reinforcing dikes. These barriers could be erected more environmentally sound and leave the tidal movement largely unmodified but can be closed during storms and high tides.
- Built to resist 10,000 year storm surge - Because the threat tidal surge poses to the low-lying areas is so severe, the Netherlands built dikes (levees), dams and other protection to resist a storm surge occurring once in 10,000 years in the most densely populated, economic centers. Protection in less populated areas is built to resist a one in 2,500 year storm surge and in the least populated areas is built to resist a one in 1,250 year storm surge.

The Netherlands has a total of 2,170 miles of primary flood defense. Although all the works authorized by the Delta Act are almost completed, the Netherlands continually faces new challenges with respect to flood control. For example, in the mid 1990s, river flooding caused the evacuation of 250,000 people, and the Delta Commission developed plans to address this new challenge.

## **Attachments**

- No. 1 - Eastern Scheldt Barrier (first major construction project)
- No. 2 - Movable storm surge barrier consisting of two movable gates
- No. 3 and No. 4 - Flood defense structure



**Eastern Scheldt Barrier (first major construction project)**



**Movable storm surge barrier consisting of two movable gates**





**Flood defense structure**



**Flood defense structure**